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EX PARTE OR LATE FILED

Office of the Secretary
Federal Communications Commission
1919 M Street, NW
Room 222
Washington, DC 20554

To Whom It May Concern:

The Rural Utilities Service (RUS or the Agency) hereby reports *ex parte* representations to members of the Federal Communications Commission (Commission) staff on October 8, 1997, at Commission offices at 2100 M Street. The meeting was open to the public and is one of a series of regular weekly meetings being held by Commission staff to analyze cost models as they relate to universal service support (CC Docket Nos. 96-45 and 97-160). The focus of the meeting was outside plant design.

The enclosed list of attendees for the meeting was supplied by Commission Staff. In addition to reporting the nature of RUS comments at the meeting, we have provided additional comment on these topics as suggested by Commission staff.

Meeting Comments:

Universal Service Support for Wireless Telephony

Michael L. Katz made a presentation on behalf of Airtouch Communications. After noting that different types of wireless service provide markedly different levels of service, RUS representatives asked Mr. Katz how such disparate service could be compared to the relatively well-defined quality of a typical copper circuit. Mr. Katz responded that in cases where the wireless was being provided by a new entrant, it should be a matter of customer choice, not government regulation. When questioned further, he advocated that a wireless new entrant should be entitled to the wireline model-based support level, even if the wireless system does not fully provide the supported services inherent in the plant design of whatever model is adopted by the Commission as a means of implementing the May 8 Order and the Order's universal service requirements. The RUS representatives argued that this was not a proper approach.

Structure Sharing

As in several previous meetings, structure sharing was discussed. Once again, the example used was a new house. RUS representatives repeated the arguments made in previous comments and ex partes, that new-development costs are not a realistic basis for estimating structure sharing.

Additional Comments:

Universal Service Support for Wireless Telephony

The RUS has long supported the appropriate application of wireless technology to lower the cost of rural plant. The Agency financed fixed-station rural radio which operated under IMTS rules in the early eighties. In the late eighties, the Agency led a coalition which developed BETRS radio. The Agency is supportive, not hostile, towards wireless technology.

On the other hand, wireless service is not a panacea. The high fixed costs of common equipment in terrestrial systems have to spread over a number of customers for this service to be feasible. In some rural areas, costs of BETRS systems have exceeded \$20,000 per subscriber. Nevertheless, these were built if they provided a real long-term savings when compared to wireline service. As far as was practical, it was attempted to make the service appear equivalent to wireline service and RUS area coverage policy required that it was billed on the same basis, i.e., flat rate, like the wireline service.

Terrain is another problem for wireless carriers. All terrestrial systems (for which spectrum has been allotted by the Commission) are line-of sight. This can make implementation prohibitively expensive in low density, mountainous areas.

The prospective satellite services look promising but the rate structure of these services are expected to be highly usage sensitive and are thus not comparable to the non-usage sensitive service found in urban areas. Further, some of these proposed services are distinctly inferior to the quality of service envisioned in the Telecommunications Act and assumed by the modelers. Most important, these services are not yet implemented which means the estimated costs and dates of availability cannot be relied upon for planning or modeling purposes.

Caps on Wireline Investment

During the meeting, Commission staff said it was their intention that the plant design not have unnecessary built-in impediments to the provision of advanced services. This was why they had found that load coils should not be used in the outside plant design. This outlook is consistent with the RUS view that plant design should be capable of migration to advanced services without wholesale plant abandonment which the Agency characterizes as "no roadblocks." The plant designed by the BCPM can be reasonably augmented to provide advanced services without the

wholesale discarding of plant. The loop plant does not present an advanced services roadblock. As far as the RUS can tell, the Hatfield model is also designed not to build roadblocks.¹

At this time, if a carrier were to use an alternative technology, the most likely would be fixed station cellular (BETRS) provided as an adjunct to a cellular mobile service. This type of BETRS does not provide access to advanced services in its conventional form. Not only that, modem access is typically slower than on an ordinary POTS line. Any attempt to provide usage sensitive advanced services would require multiple channels resulting in unaffordable access. BETRS reliability and access are generally inferior to conventional service. In one way or another, this alternative to wireline service fails to provide the supported services inherent in the outside plant designs of the models being considered by the Commission as a means of implementing the May 8 Order and the Order's universal service requirements.

In previous versions of the BCPM, a wireline cap of \$10,000 per customer was assumed. Above this level, which would be characteristic of the most remote rural areas, customers were to be served by an unspecified wireless technology. The concept of a wireless cap has also been discussed by Commission staff in their presentations on cost models.

Such an approach does not account for the fact that the reasons for high wireline cost in rural areas, low customer counts, remoteness, and terrain, are serious problem areas for wireless applications as well. At this time, the RUS knows of no wireless service that is both equivalent and cost-competitive to wireline service in remote rural areas and there is no indication that this is about to change. The Agency does not dispute the importance of wireless technologies as a service alternative in special applications, but unless there is an available wireless service² that is equivalent to the wireline service being modeled, both in its ability to provide supported services and in its ability to provide access to advanced services, wireless should not be considered as an equivalent alternative, and thus, a reasonable way to set a cap on the costs developed by the models. Further, support based on a wireline model should not be portable to a wireless carrier if it does not provide equivalent supported services.

Linking Universal Service Support to Performance

The RUS has previously commented on the need to tie universal service support to the provision of quality service, to serve as the incentive intended under the Telecommunication Act. Minimum service standards should be uniform among ETCs and, after a reasonable implementation period,

1. It is unclear at the moment exactly what type of subscriber carrier the Hatfield model will eventually provide for customers served by "T-1" circuits. At present, the model builds a discrete facility to each remote customer so it would not present a roadblock.

2. By available, the RUS means available today with known operating characteristics and costs. It must also be designed for a frequency band that has been approved by the Commission for telephone use.

providers that do not meet those standards should not receive support. If support is available, independent of some standard of service, the support will provide the wrong incentive, one which encourages the provision of inferior service.

From a customer standpoint, one of the most important service standards recommended to the States by both the Joint Board and the Commission is that a local usage component be included as part of a local service package. For the supported service to be comparable to that found in urban areas, local call minutes should not be dominated by a usage charge. There must be a reasonable period of time included in the base rate, or the usage charge must be quite low as it is for measured service in urban areas, or there could be some combination of the two.

A relatively low monthly charge with high per minute charges does not meet the Universal Service Principle of service that is reasonably comparable to that found in urban areas. Such service would discourage Internet connections. The Internet is quickly becoming a way for parents, students and teachers to stay in touch. Homework assignments are posted. Parents can keep track of student progress and make contact with teachers. The elderly can maintain contact with the world. Perhaps most important, Internet access is crucial for rural students. High usage charges means no student Internet access. At a time when the Internet with its long hold times is expected to become a dominant form of telephone use, a service with a high usage charge should not be supported by Universal Service Funds since it encourages precisely the opposite of the results intended by the Act.

Although the local usage component will be determined by the States, it is important that the Commission not adopt an outside plant design which ignores the rate characteristics of the technology employed and thus, might preclude the States from setting a reasonable local usage component if it adopts the Federal model.

Facilities-Based Competition

As a result of the focus on wireless support at the meeting, there was considerable discussion of the disconnect between the cost models and facilities-based competition. This raises questions such as:

- Assuming there were an equivalent wireless telephone system, what is the proper level of support for a wireless competitor?
- How does one calculate the proper support for the now smaller wireline competitor?

These kinds of questions lead to a consideration of a problem with the current computer models which was generally recognized at the meeting: the models assume one provider. Even if a model could accurately calculate the cost of an efficient wireline monopoly, it is difficult to imagine how two or more facilities-based competitors in high cost areas can be supported by a model which assumes only one provider and a uniform type of cost structure. The Act requires that State Commissions name more than one ETC for areas served by non-rural companies. Any model must properly account for this mandate.

The RUS believes that this is yet another reason that costs should be aggregated at as small a level as possible, no higher than at the census block level, so that any support lost to a competitor is proportional to the cost of service to the lost customer. Further, the models must be capable of recalculating the support level of a carrier based on market share.

Structure Sharing

The Commission has directed the developers to construct a model which calculates forward-looking costs. As we understand the Commission's concept of forward-looking costs, the costs should represent what an efficient new entrant would face if, starting from the existing wire centers, it built a complete system. This is referred to by the Commission staff as a "scorched node" design because it assumes that everything has been removed except for the node. The prospective customers to be served by this system, at a minimum, would include all current customers. It has been a matter of contention whether the models should also build plant to serve unserved households and habitable but uninhabited establishments. Whatever customer base is finally decided upon by the Commission, no one has ever suggested building plant to uninhabitable establishments which is what new developments are at the time of construction. Even if the model were to design plant to serve new developments under construction at the time the model is run, these new establishments would account for only a tiny percentage of the prospective customers.

Therefore, continued discussion about structure sharing based on practices in new developments has little value because it does not comport with the Commission's own direction about what the models are supposed to do. If a new entrant were to build Gunnison, CO, that new entrant would receive almost no coordinated assistance from the other existing utilities. To assume the types of sharing which occur in new developments, it would have to be assumed that all the nation's physical infrastructure were being built along with the telephone system. The proper sample on which to extrapolate sharing is a complete exchange rebuild.

Voice Grade Bandwidth

In recent meetings, attention has focused on the bandwidth for voice grade service as established in the May 8 order. At the meeting, US West recommended that the Commission change its definition to 300 to 3200 Hz. The RUS does not agree.

Bandwidth

In common usage, Bandwidth denotes information carrying capability. Wide-band is used to describe a system with high capacity whether digital or analog.

Such usage is incomplete and misleading. It is like trying to describe the volume of jar by giving its diameter. For example, the information carrying capacity of an analog circuit depends on bandwidth and the maximum signal-to-noise ratio (the maximum volume compared to the ambient noise level). A 60 dB circuit has a greater information carrying capacity than a 30 dB circuit.

Things are simpler in the digital world. Bit rate alone is a measure of information carrying capacity. The interrelation can easily be seen in modem performance. Modems convert the digital language of a computer to a different digital language, one whose frequency content is compatible with a voice circuit. Ignoring other limitations, the bit rate of a modem is proportional to both bandwidth and signal-to-noise ratio.

Existing Telephone System Bandwidth

Digital switches were first introduced a generation ago. At that time, there was little consideration of modem connections as the PC had not yet become popular. Digital theory (Nyquist Theorem) states that a digital signal can contain all the information contained in an analog signal if the analog signal is sampled at a frequency at least twice as high as the highest frequency in the analog signal. The designers of the original switches chose to sample at 8000Hz to ensure a usable bandwidth of 300 to 3400 Hz. They chose to encode each sample with 8 bits which, after some signal processing, allows for a maximum signal to noise (s/n) ratio of about 40 dB. The signal that results from 8000 samples per second, each containing 8 bits, is 64,000 bit per second (Digital signal zero or DS-0).

Such a bandwidth and signal to noise ratio (300-3400Hz /~40 dB) is the industry standard. It is not the maximum bandwidth. Using more recently developed techniques like oversampling and digital filtering, modern digital systems can operate at nearly the theoretical limit. In other words, by applying inexpensive and widely used techniques, a digital switch's bandwidth could approach a full 4000 Hz.

The RUS is not proposing that a 0 to 4000 Hz bandwidth be chosen or mandated for every element in the loop. Electronics have shorter lives and are easier to change than outside plant. Keeping in mind the "no roadblocks" philosophy, it should be recognized that the copper plant is the principal and longest lasting roadblock. As far as is practical, loop length in the cost models should be based on the maximum theoretical performance of the industry standard DS-0 channel which is 4000 Hz, the same as the top frequency given in the May 8 Order.

Summary

A wireless cap is not a practical way of limiting the estimated cost of universal service support unless the wireless technology provides equivalent supported services. The cost models need to be capable of dealing with the differing market share and cost structures of competing ETCs. Structure sharing should be extrapolated from complete system rebuilds, not construction in new developments. The copper portion of the loop should be designed for service up to 4000 Hz, the maximum frequency of a voice grade DS-0 circuit.

RUS Ex Parte Comments
Regarding 10/8/97 Weekly Cost Model Meeting

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RUS appreciates the opportunity to attend these weekly meetings.

Sincerely,

for 
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Director
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